

자리 있나요? Empty Seats?

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Performance
comparison

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separation

What has been done & roles

실제 구현 회의 1	2023/10/06	금요일	대면	
실제 구현 회의 2	2023/10/09	월요일	중	https://drive.g...
실제 구현 회의 3	2023/10/13	금요일	대면	http://www.gis...

현재 문제점-거의에서 걸치는 대상 detection

좌측 방향: 대각선에서 머리는 안 걸리는 것 확인

- 머리 dataset의 좌측 학습 (head)
- 앉어있는 상태 (Seated), 서있는 상태 학습 (notSeated)
- 좌측 후 머리 detect 기준 잡아있는 자리 판별(기)

Robotflow Dataset에 대한 해?

- https://universe.robotflow.com/shutanhan-kongkham/office_pi
- <https://universe.robotflow.com/yes-yy50q/seated> (customized)
- Robotflow에서 yolo 모델으로 URL 직접 연결
- head 데이터셋, seat 데이터셋 따로 구분

0) 참고자료

- 1) yolov5 vs 다른 버전
- 2) 자리매핑/도면 관련 의견
- 3) 2D 부영법

1

Performance comparison

김도엽, 우다연

2

Webcam testing

김도엽

3

Blur out faces

최지민

4

Perspective transformation

김도엽, 우다연

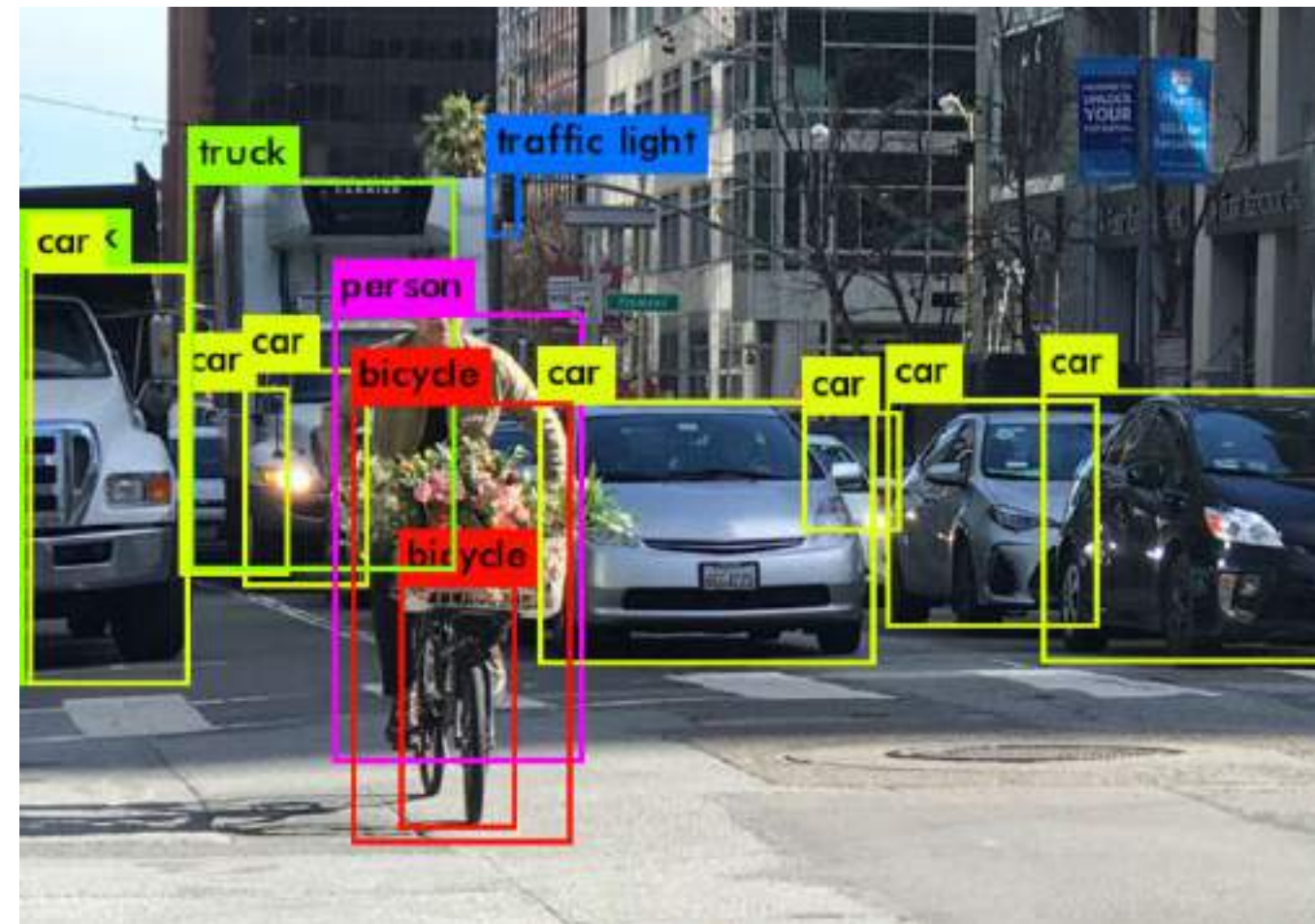
5

Seat Separation

박재윤

PART 00 | YOLOv5

- Background - Object detection



PART 00 | YOLOv5

- **Background - Object detection**

Classification



CAT

Determine what
the objects is

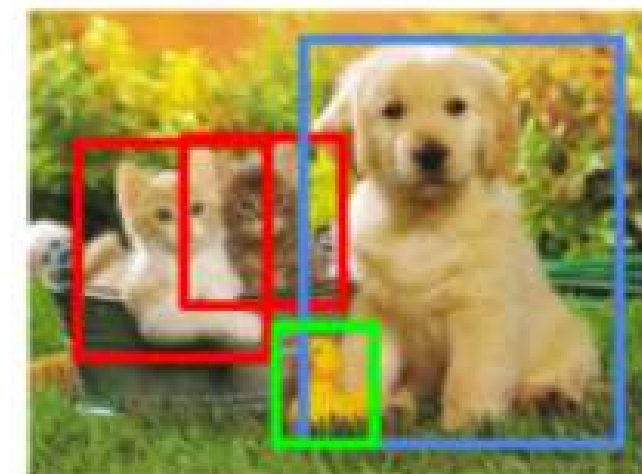
Classification + Localization



CAT

Display where the
object is located

Object Detection



CAT, DOG, DUCK

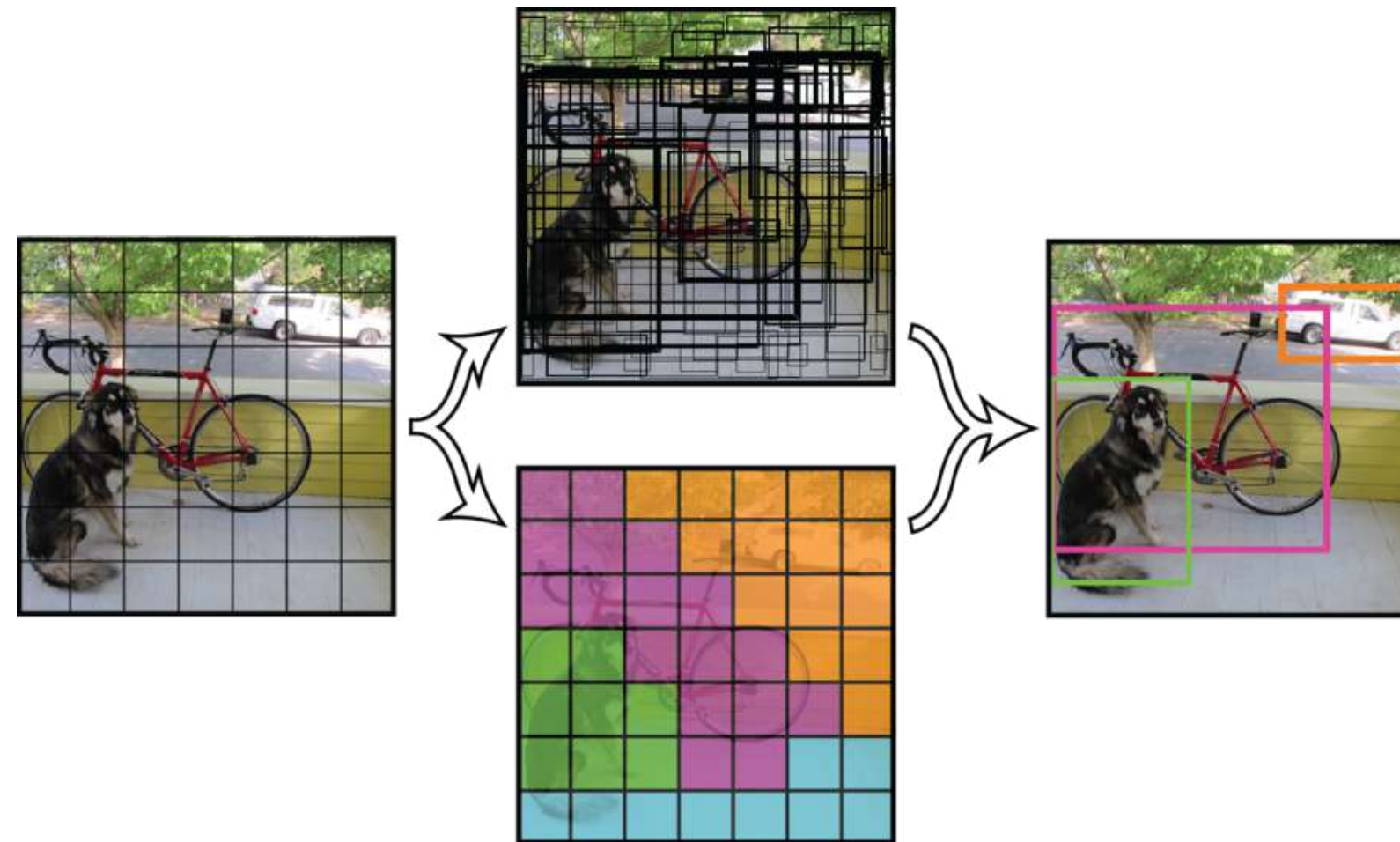
Classification &
localization of
multiple objects

PART 00 | YOLOv5

- **Background - YOLO**

Mark the **locations** where the objects are likely to exist with **bounding boxes**

Divid the image into **grids**

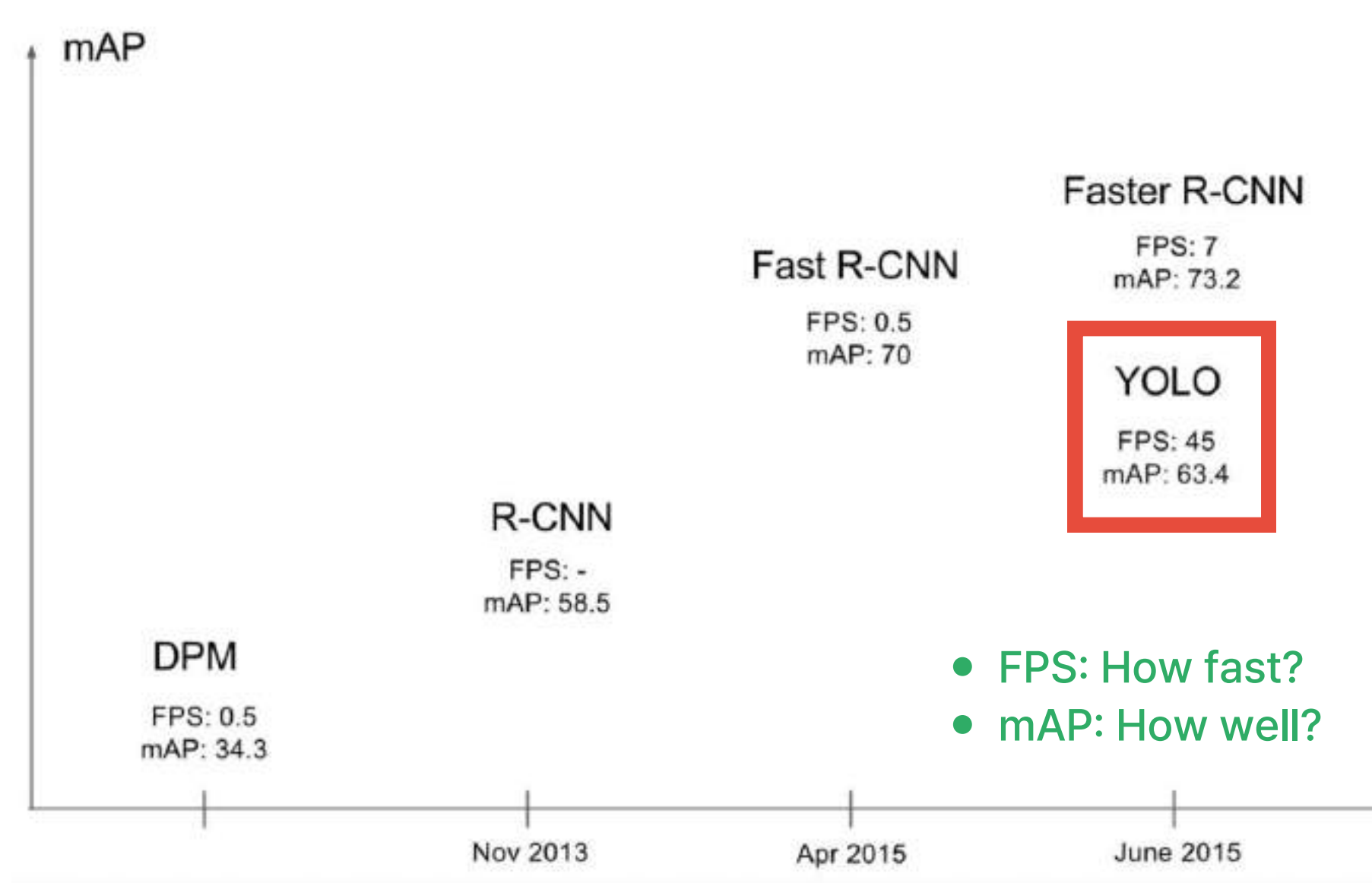


Select the **bounding boxes** that are most likely to have an object

Indicates the **class** to which each grid belongs

PART 00 | YOLOv5

• Background - YOLO



YOLO > Other models

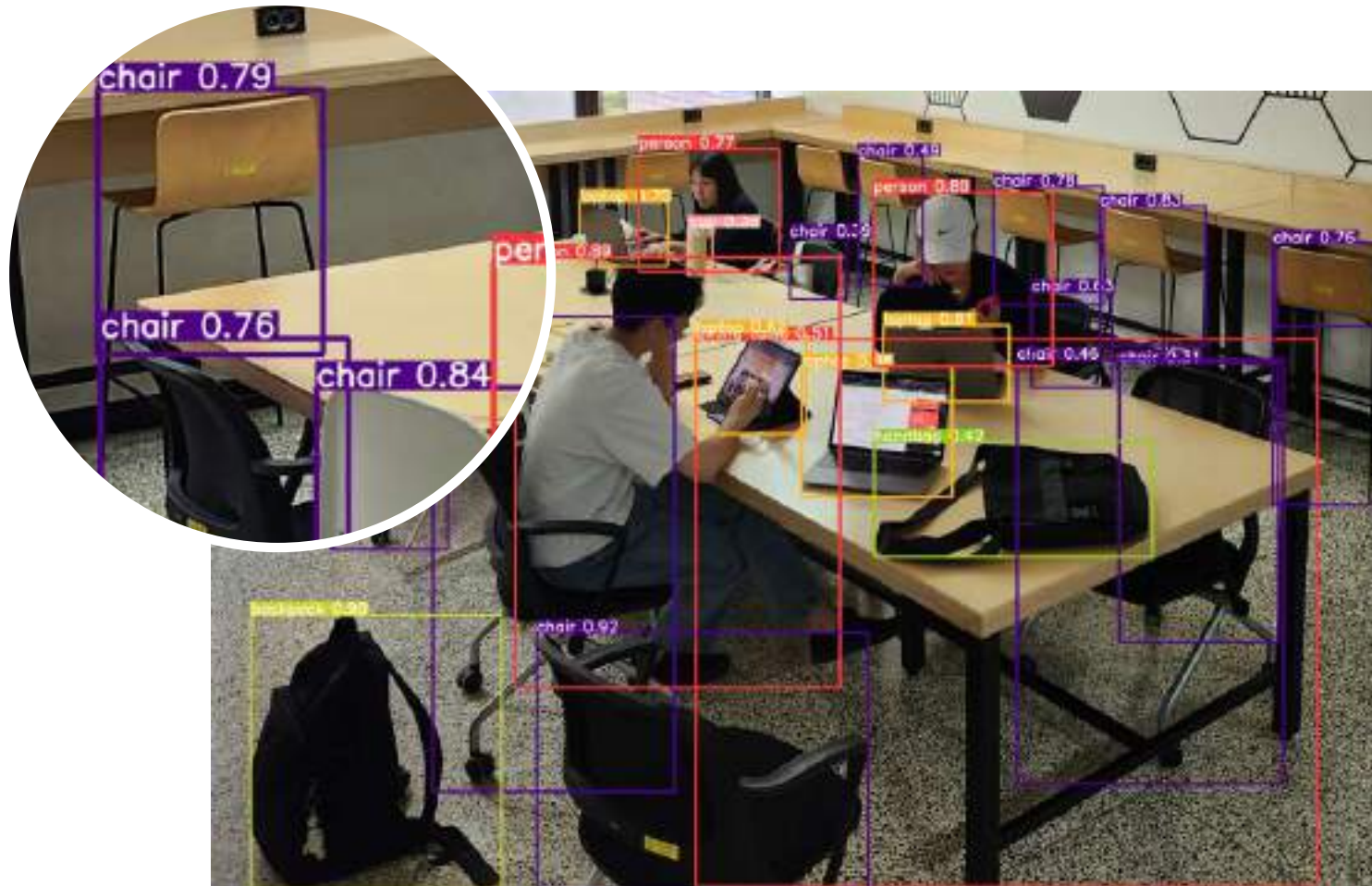
- Much faster
- More accurate



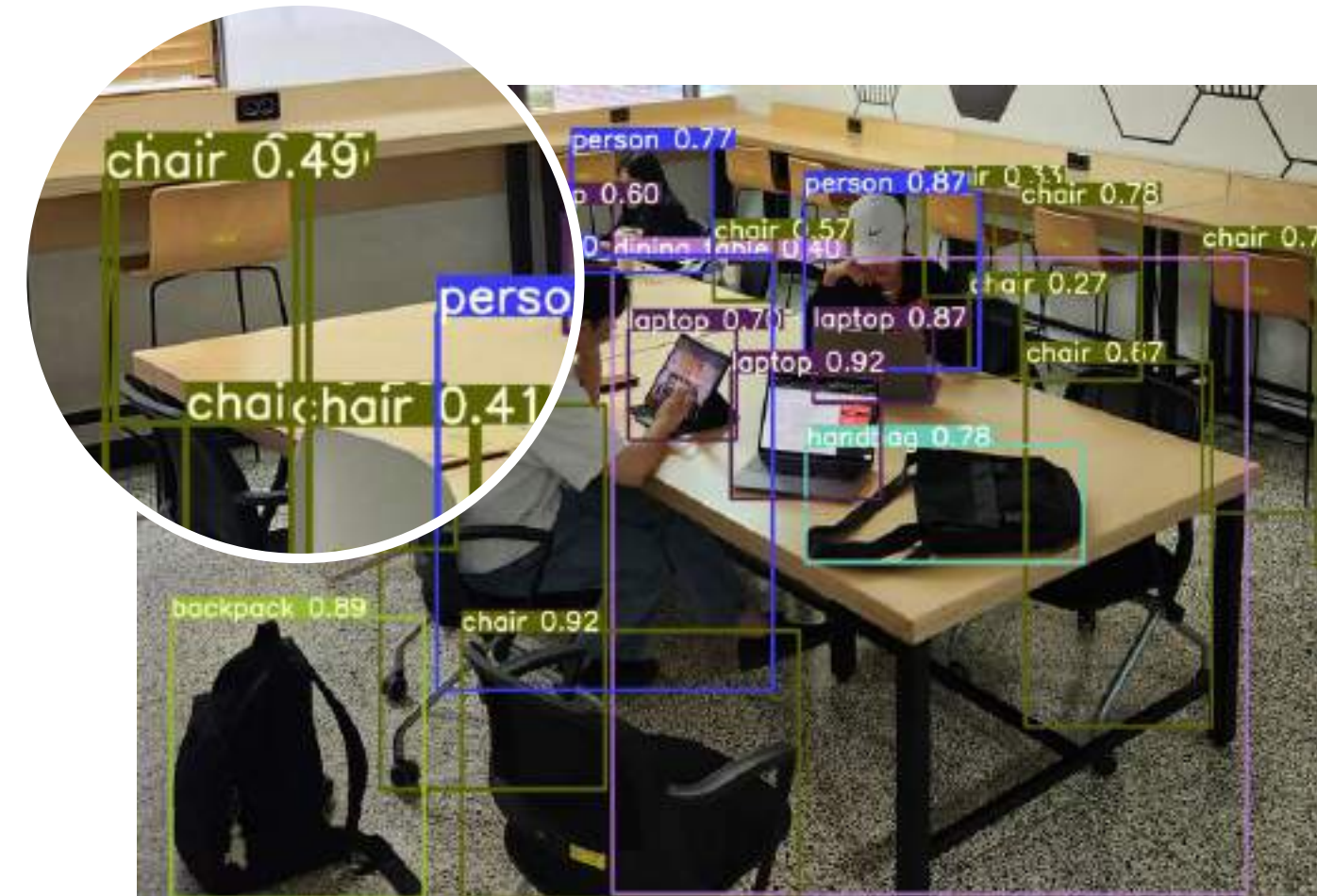
Appropriate for
real-time object detection

PART 01 | Version performance comparison

YOLOv5x



YOLOv7-E6E

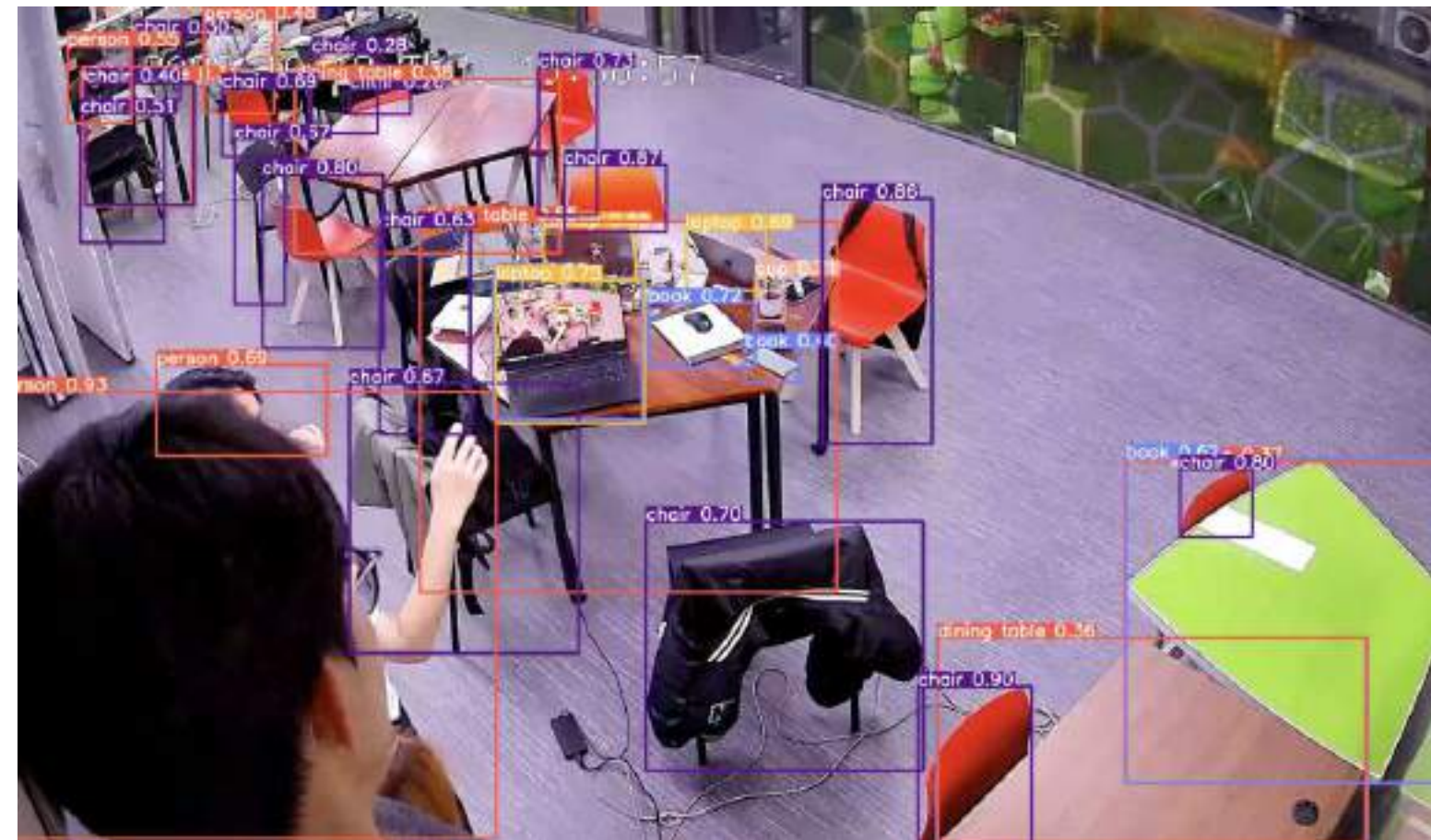


Both models have similar performance,
but YOLOv5 is much easier to use

PART 02 | Webcam testing



VIGI C440



PART 03 | Blur out faces

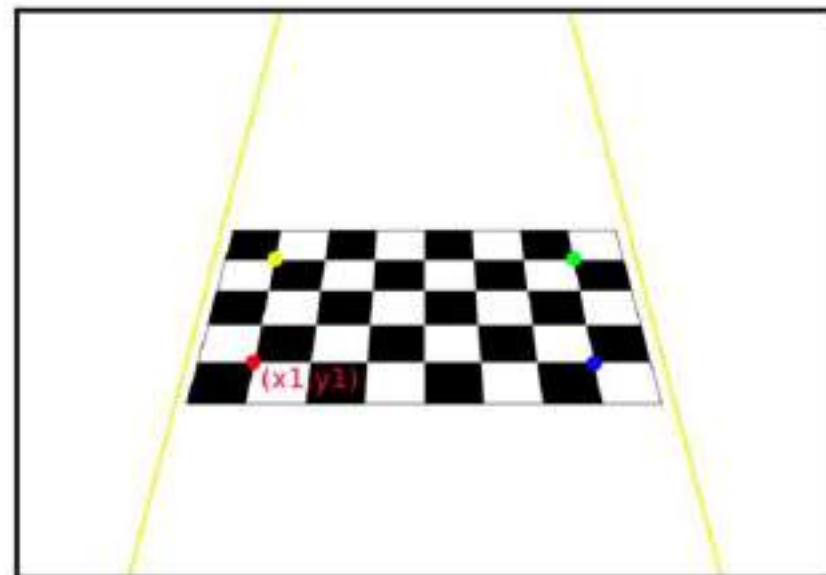


Blurred the inside of the bounding boxes

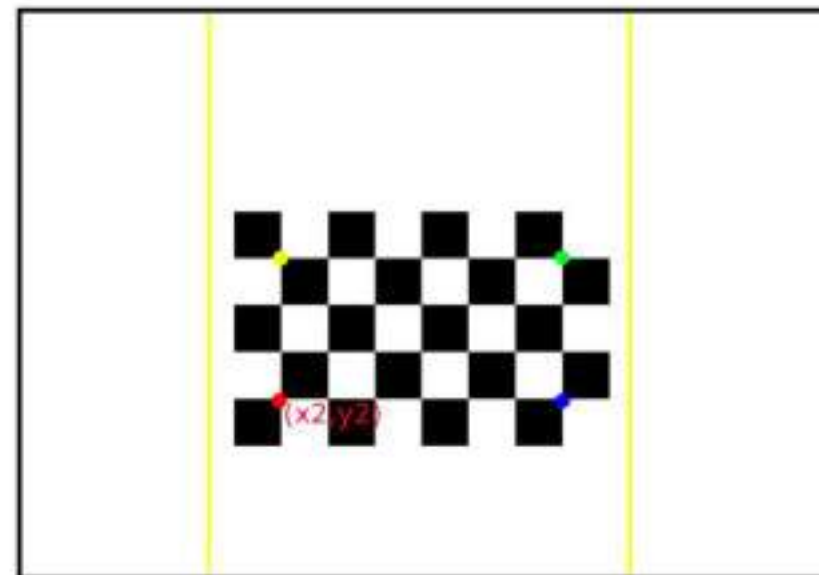
PART 04 | Perspective transformation

OpenCV Perspective transform

Input Image



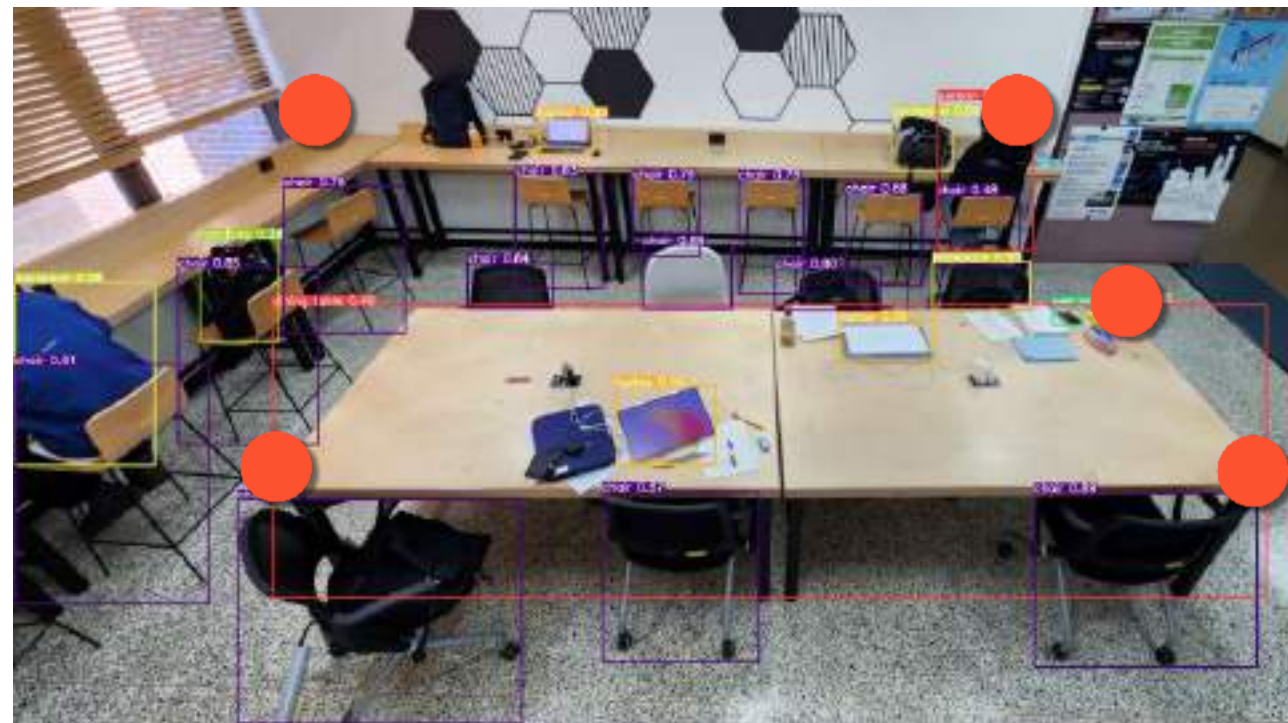
Output Image



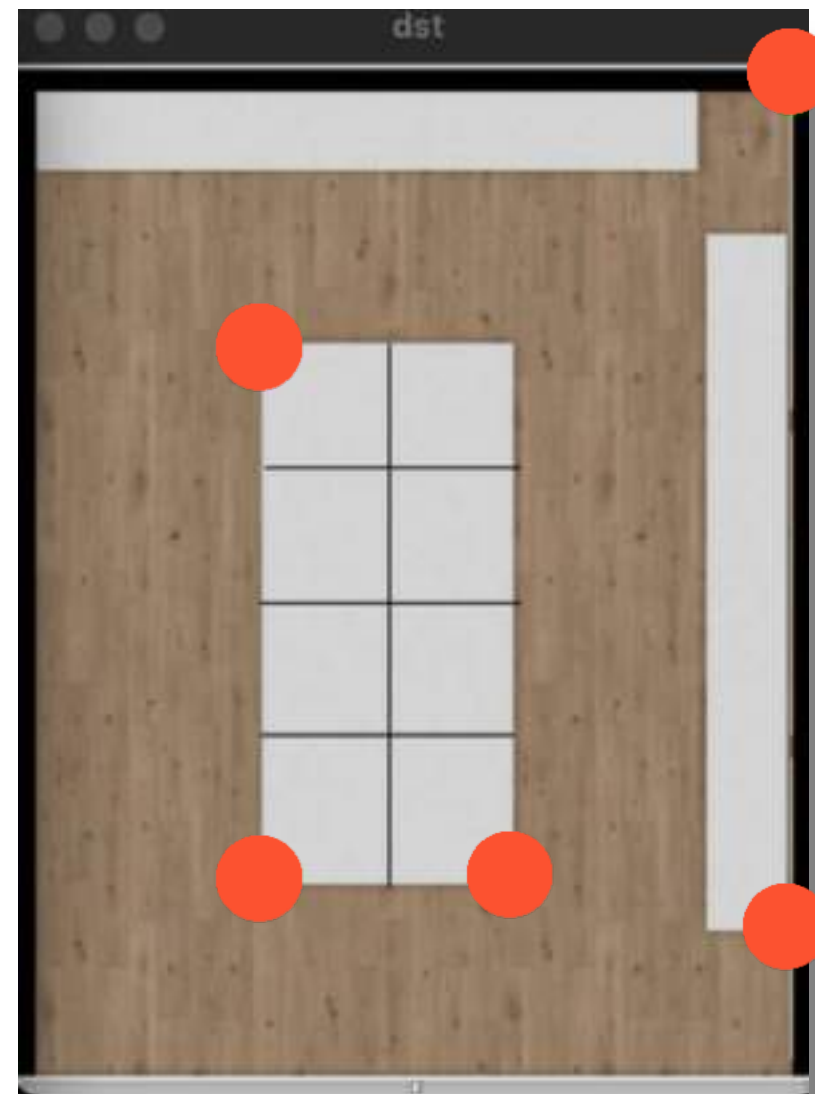
Bird-eye view

PART 04 | Perspective transformation

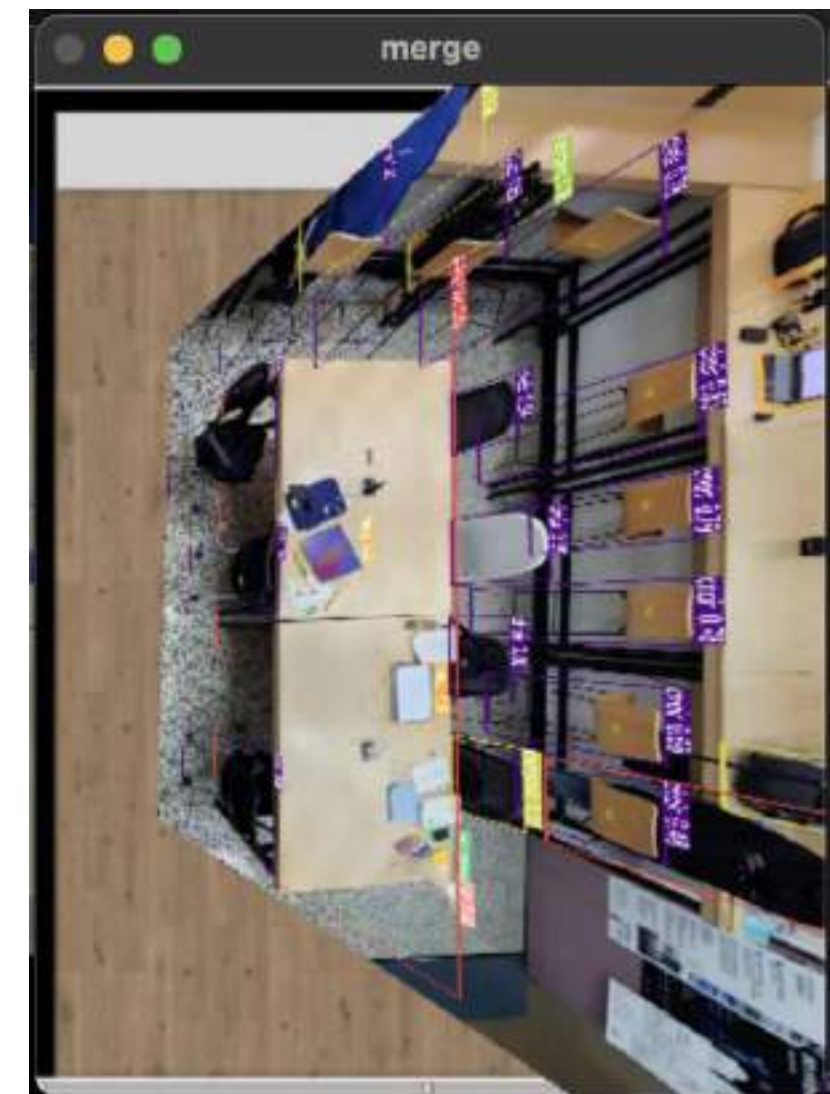
Original image



2D space



Transformed image



PART 05 | Seat separation

Transformed image

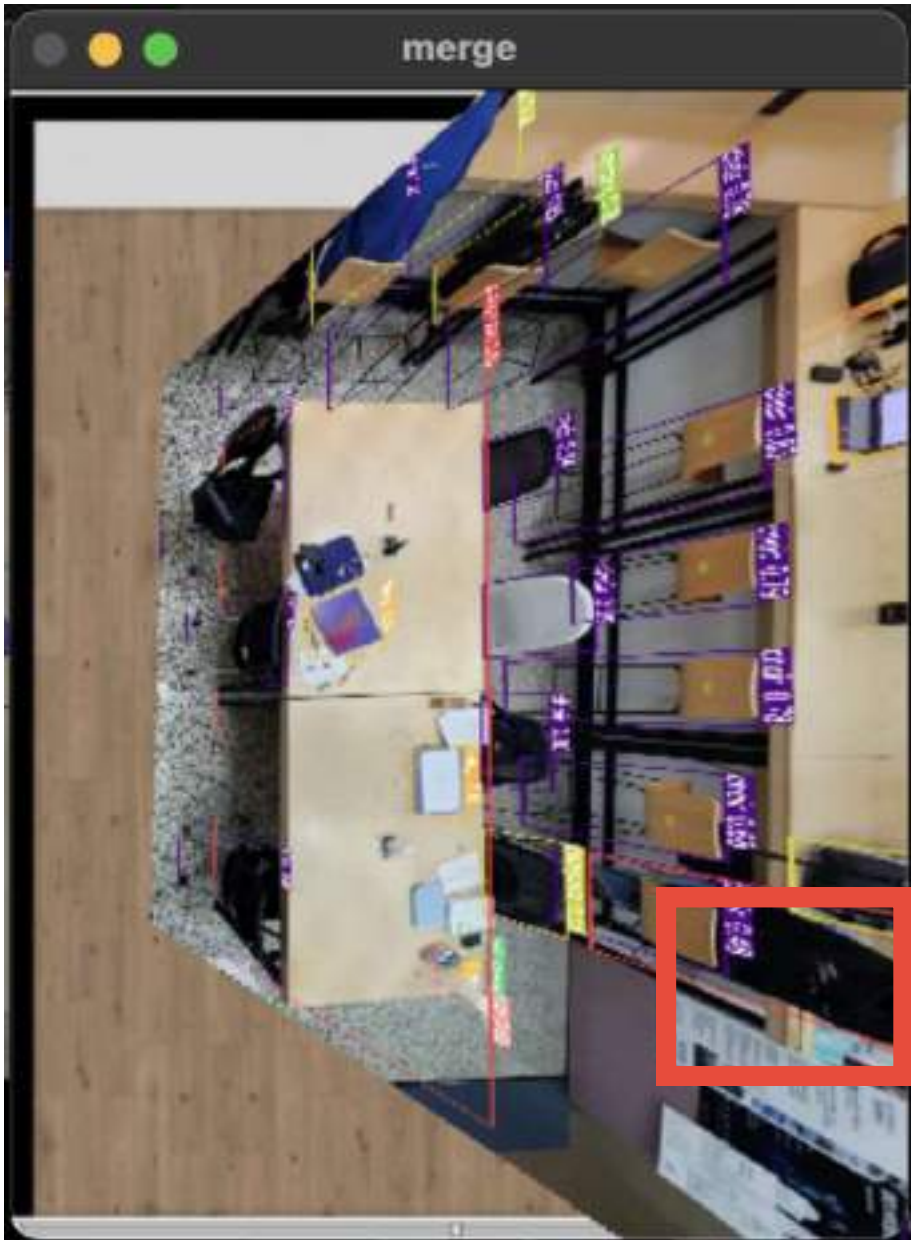
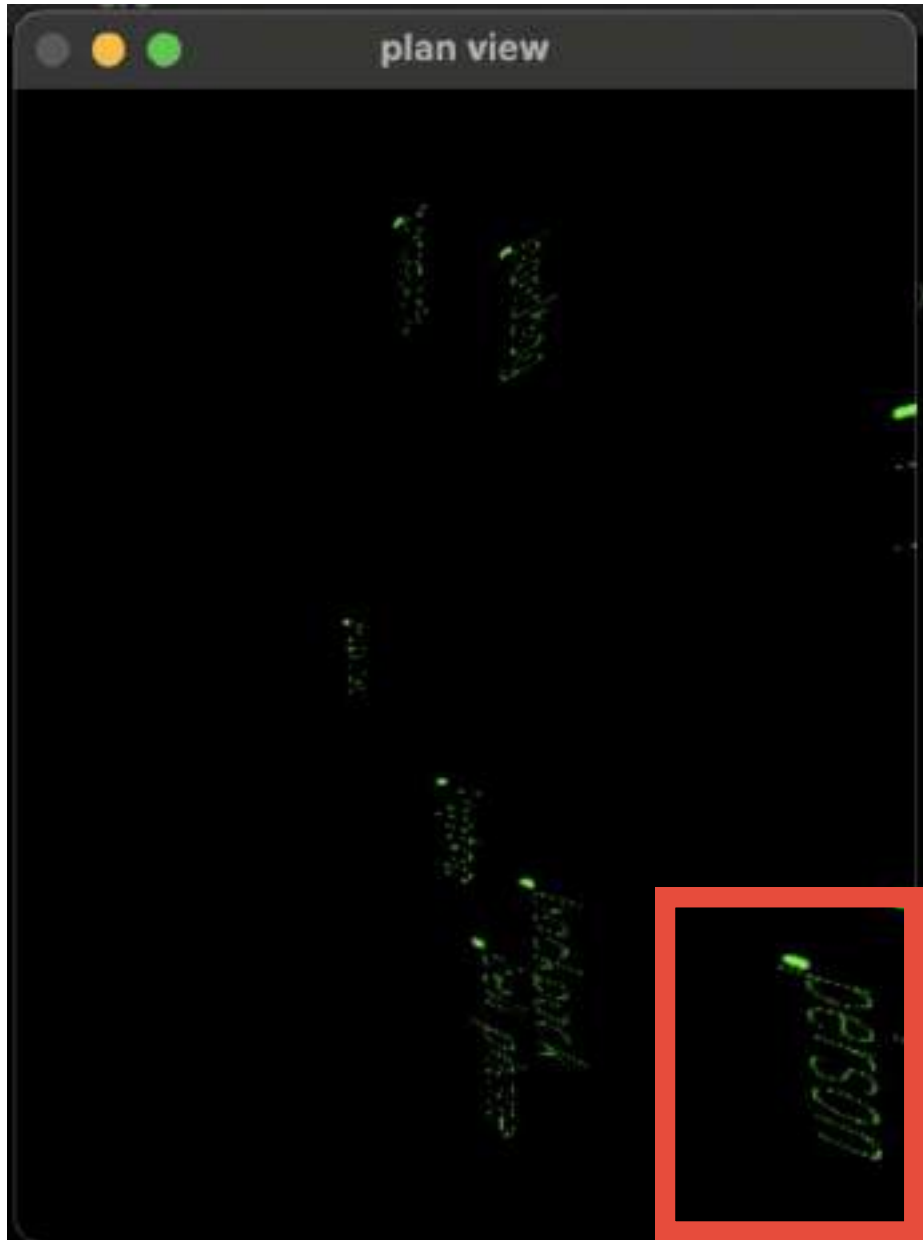
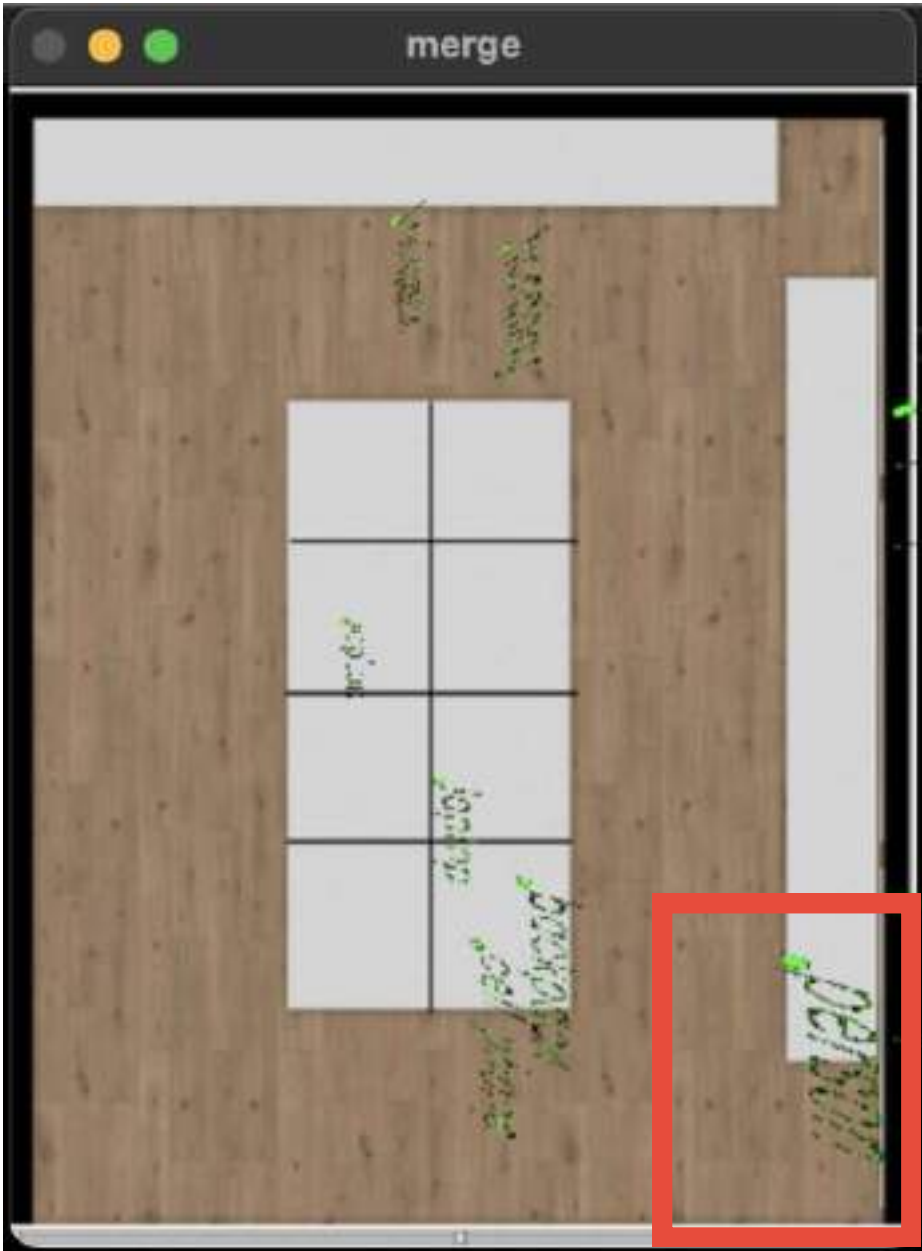


Image with labels only



Seating chart



Occupied

Future plans

	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15
Refinement of the Topic														
AI Model Design														
Data Preprocessing														
Model & Algorithm Implementation														
UI & UX Design & Implementation														
Beta Service Launch														
Incorporation of Feedback & Revisions														

Future plans

1

Connecting camera & server,
testing data transmission

김도엽, 박재윤

2

Detecting seat occupancy from
detected people and objects

우다연, 최지민

3

Sending seat availability
data to Server

우다연, 최지민

4

Web design & implementation

김도엽, 박재윤

THANK YOU

자리 있나요? Empty Seats? TEAM A (A's) 김도엽 박재윤 우다연 최지민